measures in the process as well as of the final freeze dehydrated product.

The proportion of corn meal solids in the mixture of potatoes and gelatinized corn meal is preferably at least about 6% of the total mixture in order to bind the mixture together adequately. Up to about 12% corn meal can be employed if desired, but in general more than the preferred proportion of about 7% corn meal will not be required in order to produce satisfactory final freeze-vacuum-dehydrated potato cakes. The water content of the aqueous suspension of gelatinized corn meal may be varied within the limits described above such that when the proper amount of suspension is added to the cooked and drained potatoes and the various flavoring ingredients, it will bring the water content of the mixture within the above-stated critical range of 75% to 80% of the total mixture and the corn meal solids content to at least 6% of the total mixture. The condiments, flavoring agents and flavor enhancing agents may be varied without appreciably affecting the texture or acceptability of the product. It has been found that highly acceptable potato cakes will usually have about 3% of the total weight prior to dehydration as condiments, flavoring agents, and flavor enhancing agents. In general, the major proportion of solids in the mixture from which the freeze-vacuum-dehydrated potato cakes are prepared will be potato solids. However, as mentioned above, an appreciable portion of the solids will be obtained from corn. When the proportion of corn is increased, the proportion of potato is decreased. The ratio of cooked potatoes to commercial corn meal will generally be from about 12:1 to about 4:1 while maintaining the water content in the total mixture within the above-stated critical range.

The mixture of ingredients is formed by machine or by hand into cakes of the shape and size desired and fried in deep fat at approximately 375° to 400° F. until the surfaces of the cakes develop a golden brown color. The fried potato cakes are drained free of excess fat and freeze-vacuum-dehydrated to a water content below 3% (preferably about 2 to 3%) in accordance with techniques well understood in the art, and finally, are packaged and hermetically sealed in the absence of oxygen (under vacuum, or in an inert gas atmosphere, such as nitrogen or carbon dioxide). The resulting product is quite storage-stable and rehydratable with hot water within a few seconds to the likeness of a freshly fried potato cake, without further cooking or frying. Water instantaneously penetrates evenly through the crust and the underlying dehydrated component of the cake. Thus, the potato cakes of the invention are ready-to-eat components of meals designed to be consumed without cooking and without any preparation required other than the time required to heat some water and the few seconds required for rehydration of the meal components by the hot water.

We will now proceed to disclose a specific example of the production of dehydrated potato cakes in accordance with the above-described principles. It will be understood, of course, that the above-enumerated and other advantages of our invention may also be accomplished by suitable variations of the detailed method steps, about to be set forth below, which are intended to be for illustrative purposes, and not for the purpose of limiting the scope of our invention.

EXAMPLE

Raw U.S. #1 grade Idaho Russet potatoes are washed, peeled, cut into strips with cross-sectional dimensions of ¼" and cooked for 5 minutes in water at 200° to 210° F. The cooked potatoes are then drained and cooled on a screen (U.S. #8 mesh) for not less than 15 minutes at room temperature and a relative humidity of about 30 to 40% to substantially eliminate surface water therefrom.

Seven parts by weight of commercial grade of degerminated corn meal having an initial water content of about 12% by weight are dispersed in 21 parts by weight of water and the following flavor ingredients are added: 1.25 parts of salt, 0.08 part of white pepper, 0.50 part of minced, dehydrated onion, 1.00 part of shortening, and 0.10 part of monosodium glutamate. The slurry of corn meal and flavoring ingredients is heated until the corn meal has completely gelatinized (approximately 185° F.), forming a suspension of the corn meal. Then 69.07 parts by weight of drained, cooked potatoes are added to the corn meal suspension and the mixture is thoroughly mixed in a food mixer. The resulting mixture is formed by hand or by machine into cakes approximately 3¾-inch x 2½-inch x ¾-inch in dimensions. These cakes are fried in deep fat at 375° to 400° F. until the surfaces thereof develop a golden brown color. This usually requires approximately 3 minutes cooking time. The cakes are then drained free of excess fat, cooled, and then freeze-vacuum dehydrated by procedures generally known in the art wherein the frozen moisture (ice) is removed by sublimation.

Recommended freeze drying conditions for cakes on trays placed on heated platens of a conventional vacuum-freeze dryer are a vacuum of about 0.5 to 1.5 mm. (say about 0.75–1.00 mm.) of mercury absolute, a platen temperature varied during the dehydration cycle beginning at about 130° F. and being reduced to a temperature below 125° F. by the end of the cycle, and a dehydration time of approximately 12 hours. The platen is heated by circulating a heating fluid through tubes therein. In an alternate drying procedure, the potato cakes are placed on suspended trays between radiant heating plates at a plate temperature of 160° F. under the same vacuum conditions as above, and for a dehydration time of about 5 to 6 hours. The water content of the dehydrated product is below 3%, and may be as low as a trace; about 2 to 3% water content is presently considered most desirable for good storage stability and about 2.5% water content is preferred.

If it is intended to store the dehydrated potato cakes over an extended period of time, they should be packed in the absence of atmospheric oxygen, e.g., canned with a high vacuum (say of the order of about 26–27 inches of mercury) or in the presence of an inert gas, such as carbon dioxide or (preferably) nitrogen. In lieu of a can, flexible plastic waterproof hermetically heat-sealable pouches, e.g., of polyethylene terephthalate film may be employed, with the exclusion of atmospheric oxygen. Samples of the potato cakes produced in accordance with this example and stored in the absence of oxygen at semi-tropical temperatures of the order of 100° F. for 6 months have been found completely acceptable in appearance, texture, and flavor, after rehydration.

While we have described an example of our process using U.S. #1 grade Idaho Russet potatoes, other varieties and grades of potatoes may be used to equal advantage. We have, for example, found that Katahdin, White Rose or Irish Cobbler potatoes may be substituted for the Idaho Russet potatoes in the example described and that U.S. #2 grade potatoes in all four varieties may be used.

As heretofore indicated, rehydration is virtually instantaneous upon addition of hot water (e.g., about 170° to 212° F.), which can be done in a sauce pan or canteen cup, if desired. The hot water can be obtained by the individual soldier by the use of ordinary heat tablets (e.g., trioxane tablets) even under front line combat condition. Rehydration time is a matter of seconds, say about 30 to 60 seconds, for a dehydrated potato cake of the thickness of the above example. The potato cake can be eaten after rehydration for shorter periods of time or without any rehydration other than that which would occur in the